FIG. 1

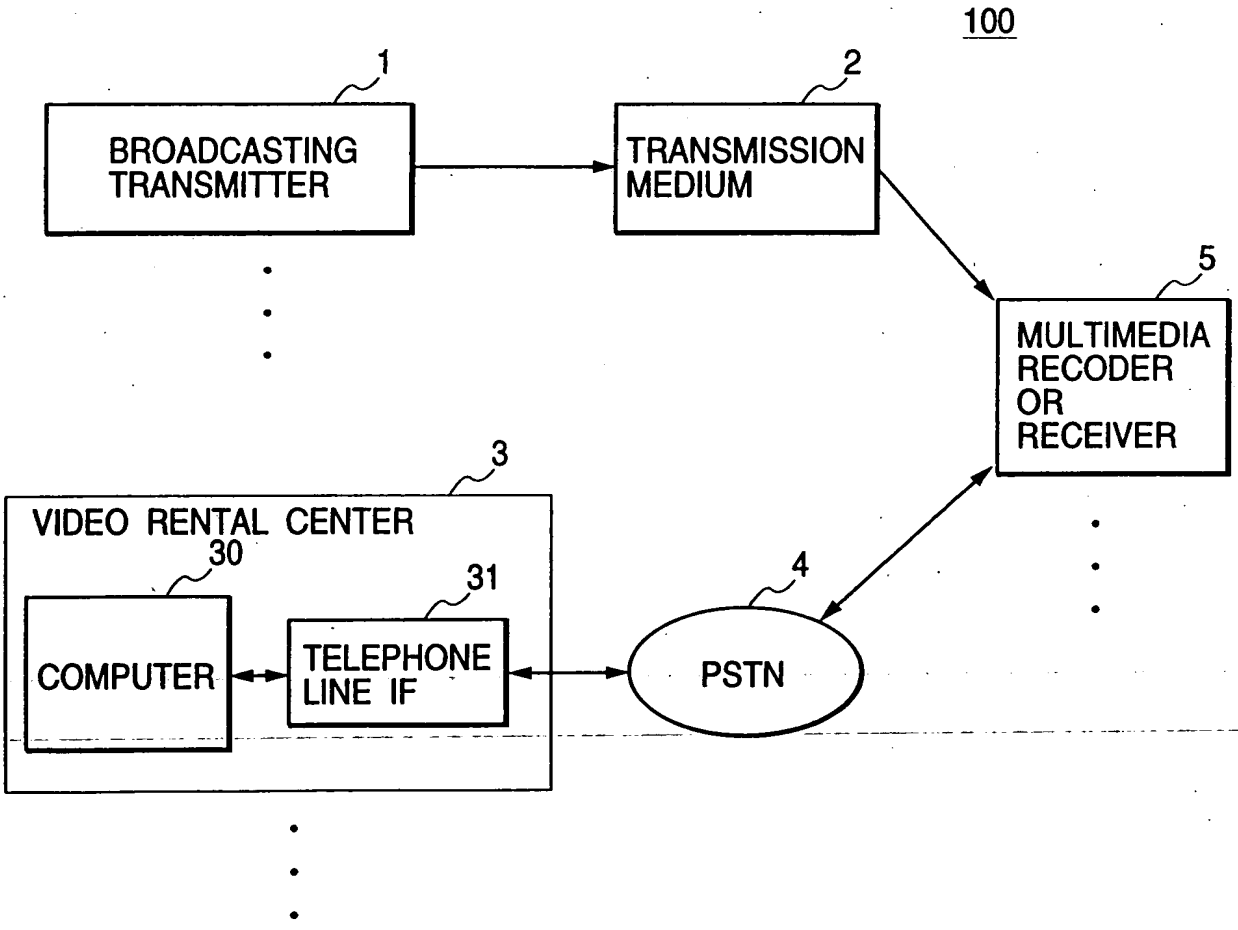

100
1
BROADCASTING TRANSMITTER
2
TRANSMISSION MEDIUM
5
MULTIMEDIA RECODER OR RECEIVER
3
VIDEO RENTAL CENTER
30
COMPUTER
31
TELEPHONE LINE IF
4
PSTN

FIG. 2

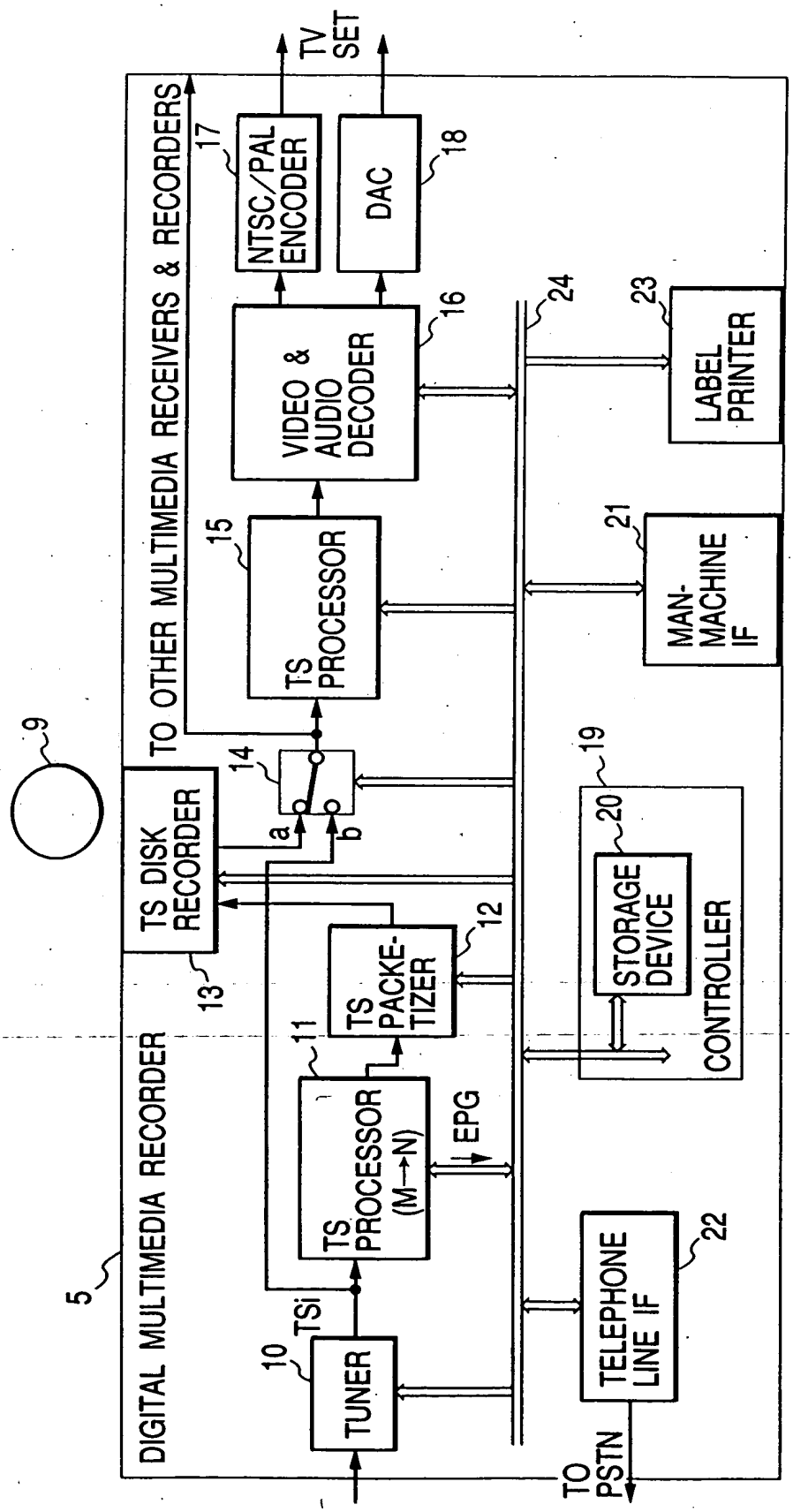

DIGITAL MULTIMEDIA RECORDER
5
TO OTHER MULTIMEDIA RECEIVERS & RECORDERS
TV SET
9
TUNER
10
TSi
TS PROCESSOR (M→N)
11
EPG
TS PACKE-TIZER
12
TS DISK RECORDER
13
14
a
b
TS PROCESSOR
15
VIDEO & AUDIO DECODER
16
NTSC/PAL ENCODER
17
DAC
18
STORAGE DEVICE
20
CONTROLLER
19
MAN-MACHINE IF
21
TELEPHONE LINE IF
22
LABEL PRINTER
23
24
TO PSTN

FIG. 3

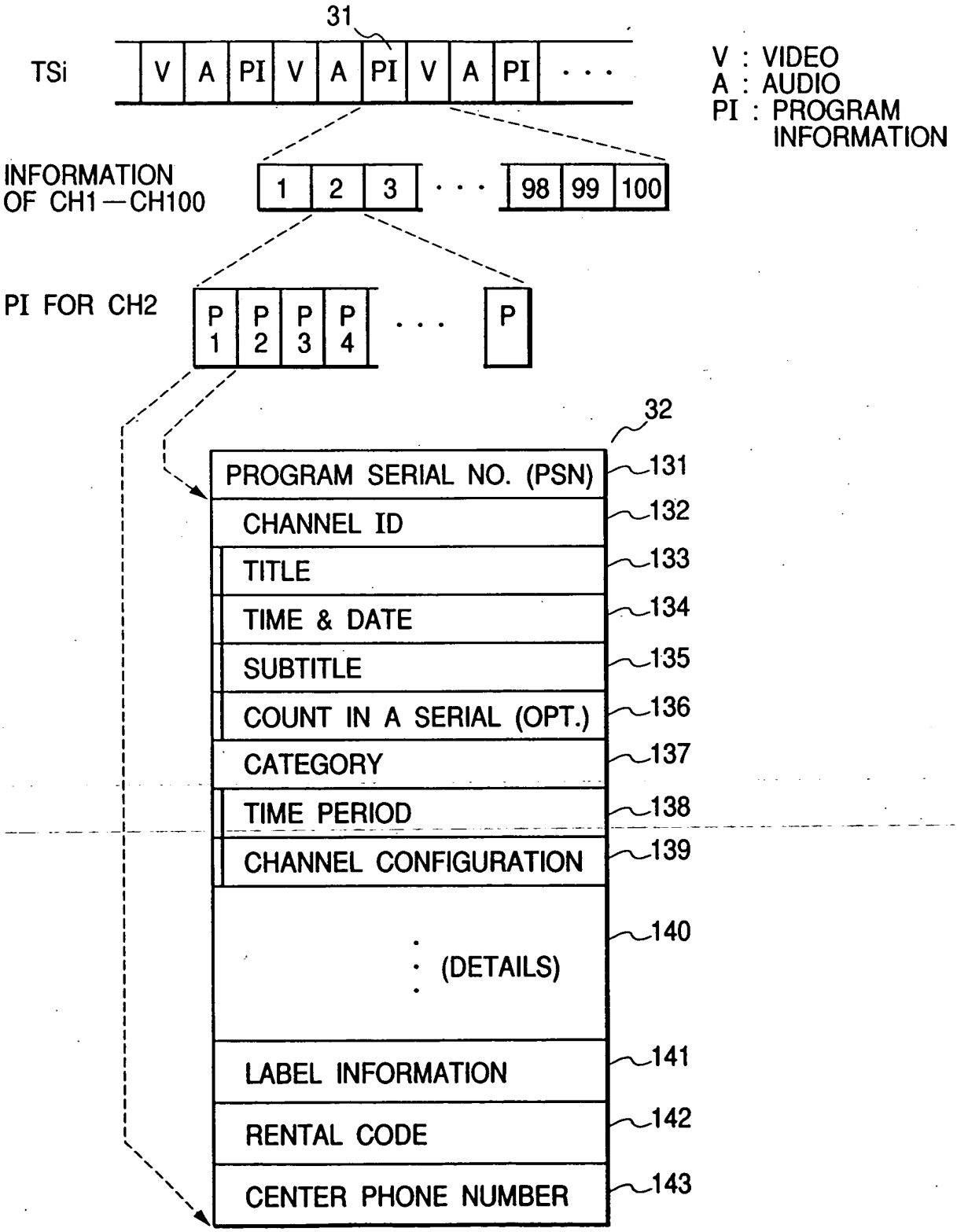

31
TSi
V A PI V A PI V A PI . . .
V : VIDEO
A : AUDIO
PI : PROGRAM INFORMATION
INFORMATION OF CH1—CH100
1 2 3 . . . 98 99 100
PI FOR CH2
P1 P2 P3 P4 . . . P
32
PROGRAM SERIAL NO. (PSN) 131
CHANNEL ID 132
TITLE 133
TIME & DATE 134
SUBTITLE 135
COUNT IN A SERIAL (OPT.) 136
CATEGORY 137
TIME PERIOD 138
CHANNEL CONFIGURATION 139
(DETAILS) 140
LABEL INFORMATION 141
RENTAL CODE 142
CENTER PHONE NUMBER 143

FIG. 4

PROGRAM INFORMATION TABLE STORED IN THE STORAGE DEVICE 20

131	132	133	134	135	136	137	138	32t 139	140
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋯
100123	45	DORA THE VAGRANT	1998/2/6 20:00–20:54	DORA GOES TO DENVER	3/15	D7	0–54	VIDEO1 : NTSC AUDIO1 : STEREO	⋯
			1998/2/13 20:00–20:54	DORA GOES TO BOSTON	4/15				32r
			1998/2/20 20:00–20:54	DORA GOES TO AUSTIN	5/15				
			1998/2/27 20:00–20:54	DORA GOES TO ALBANY	6/15				
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋯
100234	56	NFL99 : THE SUPER BOWL	1998/2/6 18:00–20:59	XX vs. YY		S4	0–119	VIDEO1 : NTSC [ORDINARY RELAY] VIDEO2 : NTSC [XX SIDE] VIDEO3 : NTSC [YY SIDE] AUDIO1 : STERIO [ORDINARY RELAY] AUDIO2 : MONO [ON THE XX SIDE] AUDIO3 : MONO [ON THE YY SIDE]	⋯
							120–179	VIDEO1 : NTSC [ORDINARY RELAY] VIDEO2 : NTSC [XX SIDE] VIDEO3 : NTSC [YY SIDE] AUDIO1 : STERIO [ORDINARY RELAY] AUDIO2 : MONO [ON THE XX SIDE] AUDIO3 : MONO [ON THE YY SIDE] AUDIO4 : MONO [COMMENTARY]	32r
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋯

FIG. 5

RECOMMENDED PROGRAM LIST TRANSMITTED IN THE EVENT LIST TABLE

40

LIST TITLE	THE NAGANO WINTER OLYMPICS RELAY	41
VALID PERIOD	1998/2/7—1998/2/18	42
CHANNEL NUMBER	BROADCAST TIME & DATE	
15	1998/2/7 10:00—11:59	
7	1998/2/9 13:00—14:59	
8	1998/2/13 13:00—14:59	
⋮	⋮	

132 134

FIG. 7

RECORDING QUEUE

CHANNEL NUMBER	BROADCAST TIME & DATE
17	1998/2/10 17:00—17:59
78	1998/2/11 13:00—14:59
6	1998/2/11 21:00—22:56

45

132 134

FIG. 6

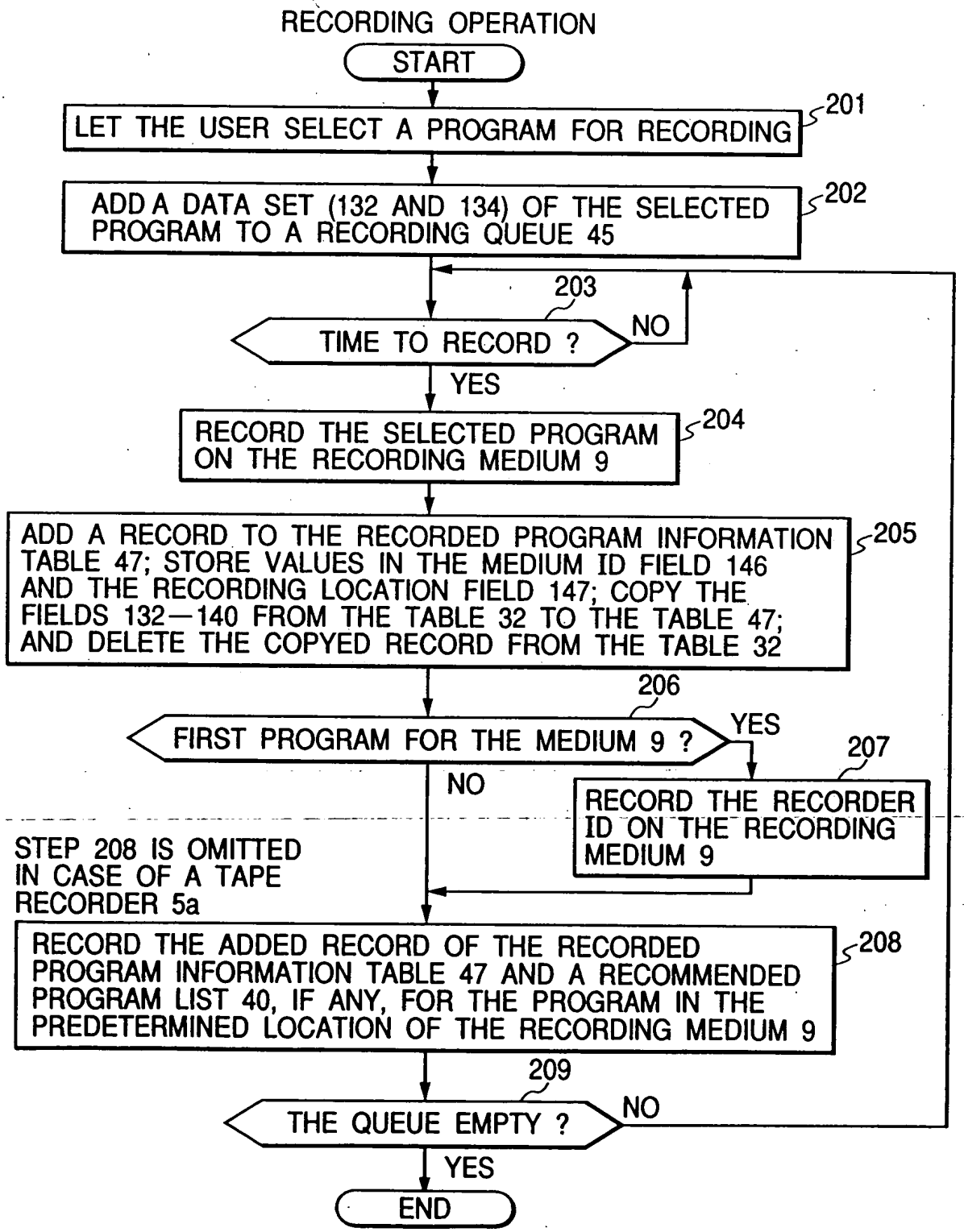

RECORDING OPERATION
START
LET THE USER SELECT A PROGRAM FOR RECORDING
201
ADD A DATA SET (132 AND 134) OF THE SELECTED PROGRAM TO A RECORDING QUEUE 45
202
203
TIME TO RECORD ?
NO
YES
RECORD THE SELECTED PROGRAM ON THE RECORDING MEDIUM 9
204
ADD A RECORD TO THE RECORDED PROGRAM INFORMATION TABLE 47; STORE VALUES IN THE MEDIUM ID FIELD 146 AND THE RECORDING LOCATION FIELD 147; COPY THE FIELDS 132—140 FROM THE TABLE 32 TO THE TABLE 47; AND DELETE THE COPYED RECORD FROM THE TABLE 32
205
206
FIRST PROGRAM FOR THE MEDIUM 9 ?
YES
NO
207
RECORD THE RECORDER ID ON THE RECORDING MEDIUM 9
STEP 208 IS OMITTED IN CASE OF A TAPE RECORDER 5a
RECORD THE ADDED RECORD OF THE RECORDED PROGRAM INFORMATION TABLE 47 AND A RECOMMENDED PROGRAM LIST 40, IF ANY, FOR THE PROGRAM IN THE PREDETERMINED LOCATION OF THE RECORDING MEDIUM 9
208
209
THE QUEUE EMPTY ?
NO
YES
END

FIG. 8

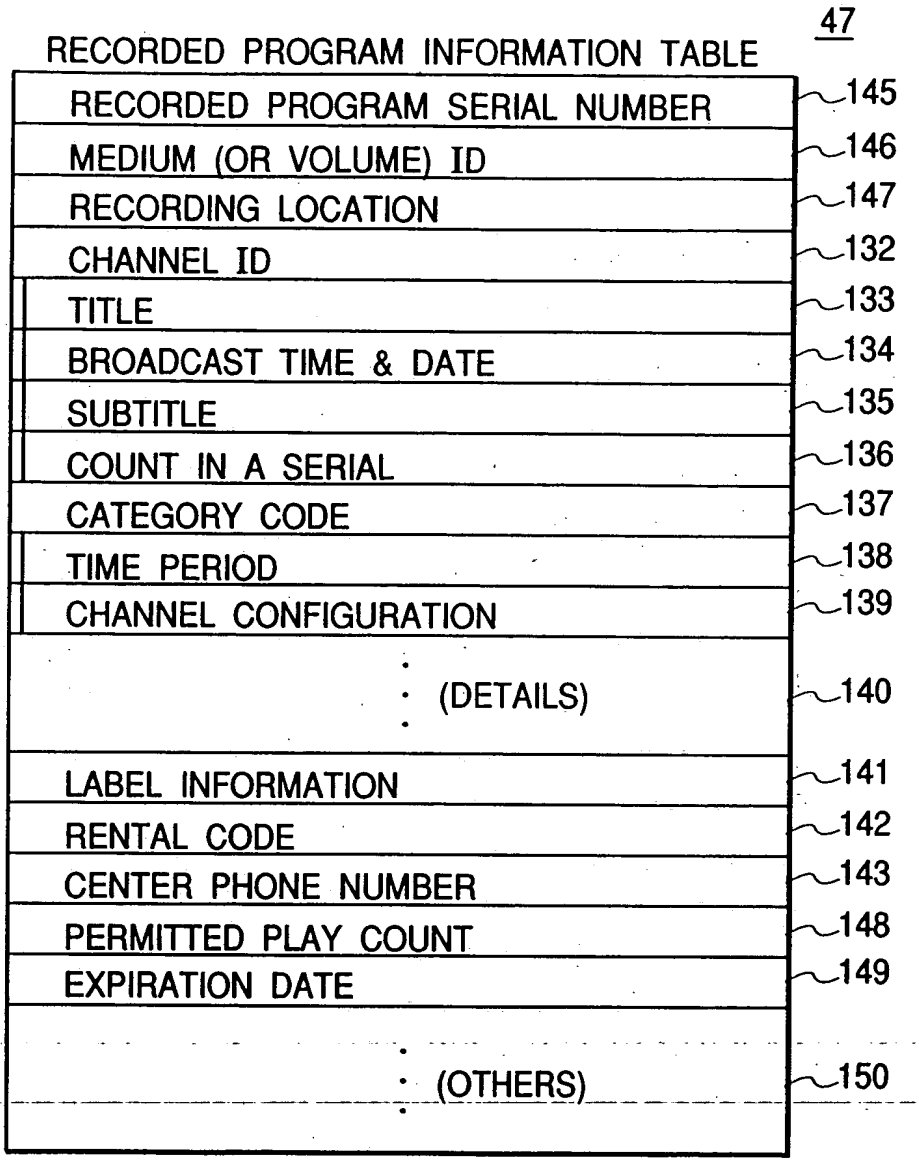

47
RECORDED PROGRAM INFORMATION TABLE
RECORDED PROGRAM SERIAL NUMBER
145
MEDIUM (OR VOLUME) ID
146
RECORDING LOCATION
147
CHANNEL ID
132
TITLE
133
BROADCAST TIME & DATE
134
SUBTITLE
135
COUNT IN A SERIAL
136
CATEGORY CODE
137
TIME PERIOD
138
CHANNEL CONFIGURATION
139
(DETAILS)
140
LABEL INFORMATION
141
RENTAL CODE
142
CENTER PHONE NUMBER
143
PERMITTED PLAY COUNT
148
EXPIRATION DATE
149
(OTHERS)
150

FIG. 9

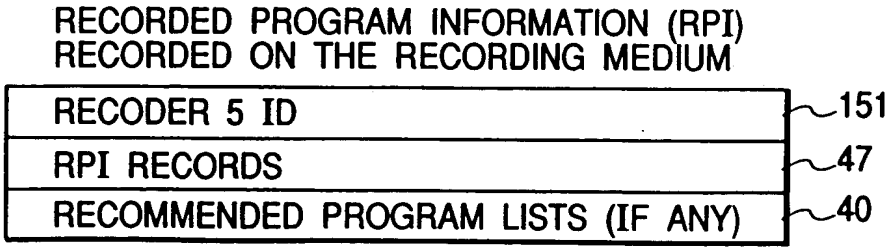

RECORDED PROGRAM INFORMATION (RPI)
RECORDED ON THE RECORDING MEDIUM
RECODER 5 ID
151
RPI RECORDS
47
RECOMMENDED PROGRAM LISTS (IF ANY)
40

FIG. 10

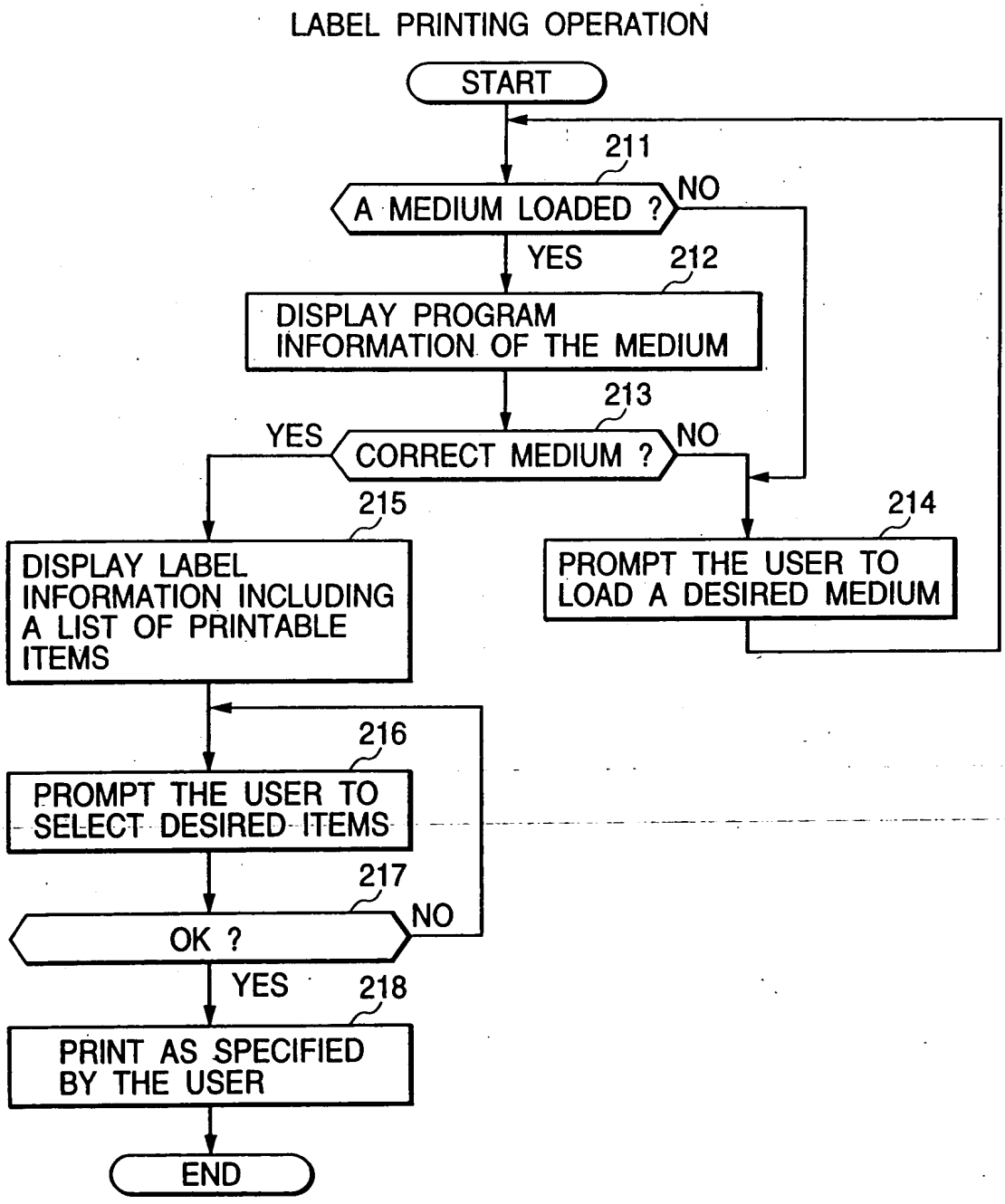

LABEL PRINTING OPERATION
START
211
A MEDIUM LOADED ?
NO
YES
212
DISPLAY PROGRAM INFORMATION OF THE MEDIUM
213
YES
CORRECT MEDIUM ?
NO
215
214
DISPLAY LABEL INFORMATION INCLUDING A LIST OF PRINTABLE ITEMS
PROMPT THE USER TO LOAD A DESIRED MEDIUM
216
PROMPT THE USER TO SELECT DESIRED ITEMS
217
OK ?
NO
YES
218
PRINT AS SPECIFIED BY THE USER
END

FIG. 11

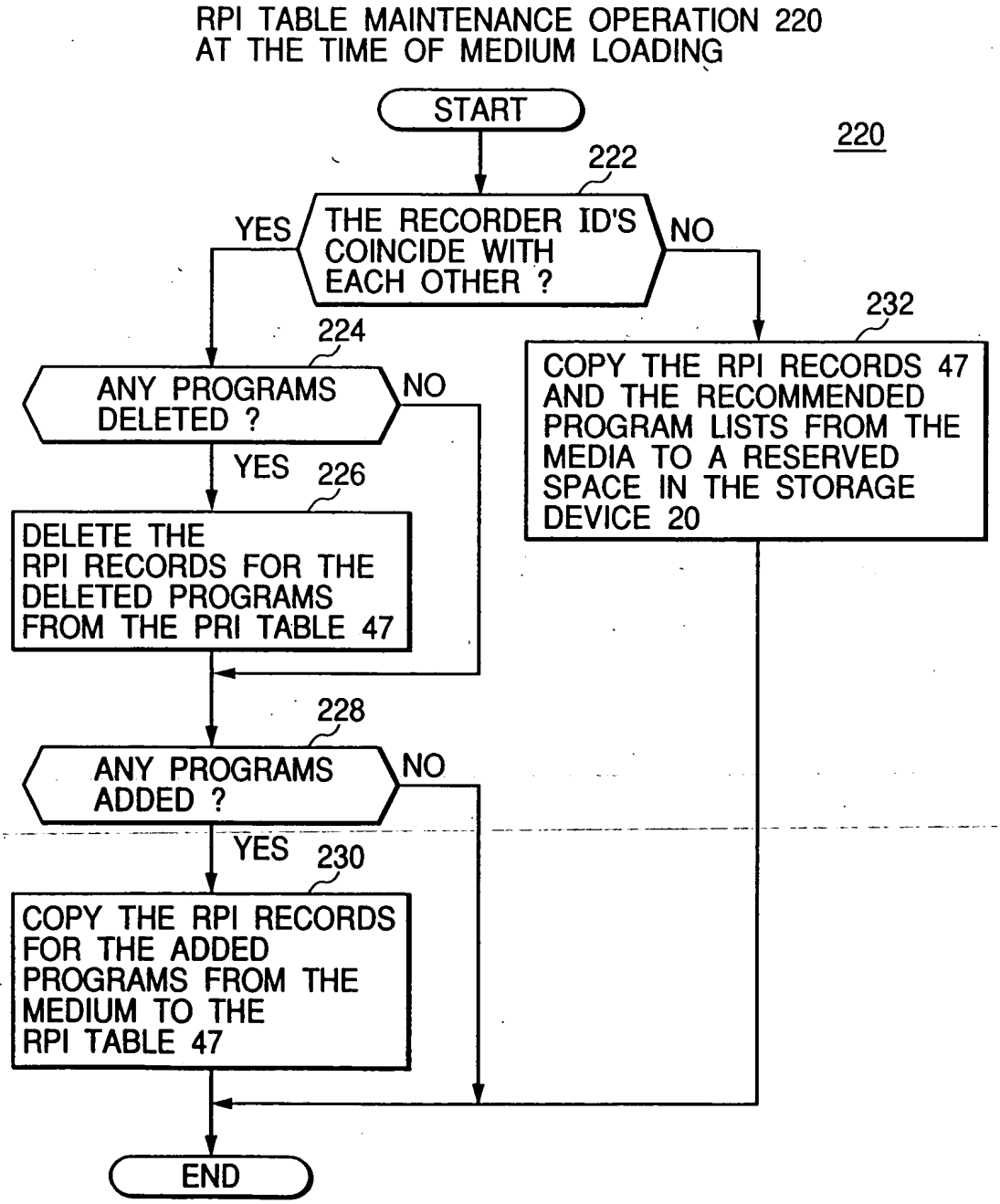

RPI TABLE MAINTENANCE OPERATION 220
AT THE TIME OF MEDIUM LOADING
START
220
222
THE RECORDER ID'S COINCIDE WITH EACH OTHER ?
YES
NO
224
ANY PROGRAMS DELETED ?
NO
YES
226
DELETE THE RPI RECORDS FOR THE DELETED PROGRAMS FROM THE PRI TABLE 47
228
ANY PROGRAMS ADDED ?
NO
YES
230
COPY THE RPI RECORDS FOR THE ADDED PROGRAMS FROM THE MEDIUM TO THE RPI TABLE 47
232
COPY THE RPI RECORDS 47 AND THE RECOMMENDED PROGRAM LISTS FROM THE MEDIA TO A RESERVED SPACE IN THE STORAGE DEVICE 20
END

FIG. 12

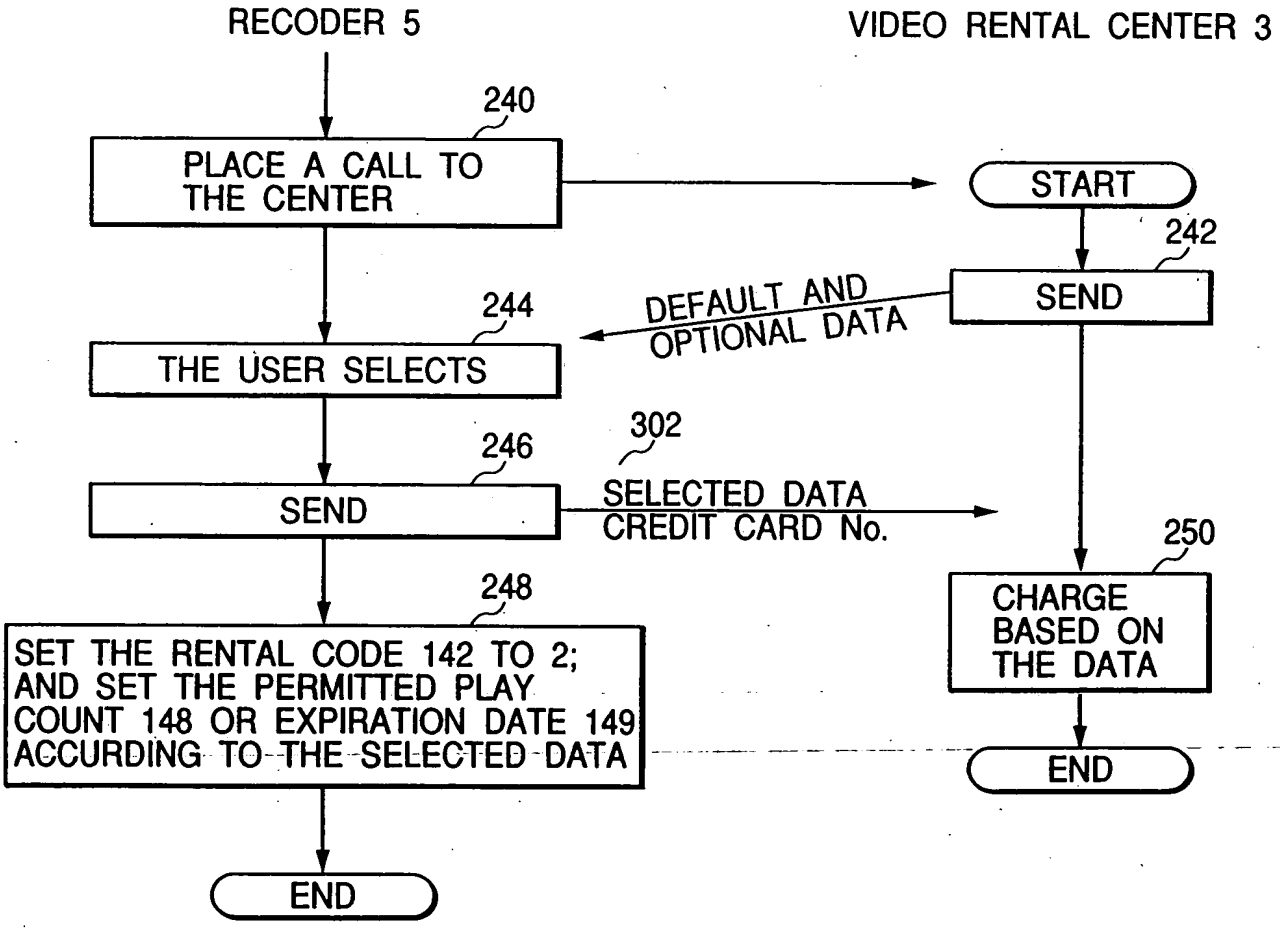

RECODER 5
VIDEO RENTAL CENTER 3
240
PLACE A CALL TO THE CENTER
START
242
SEND
DEFAULT AND OPTIONAL DATA
244
THE USER SELECTS
302
246
SEND
SELECTED DATA
CREDIT CARD No.
250
CHARGE BASED ON THE DATA
248
SET THE RENTAL CODE 142 TO 2; AND SET THE PERMITTED PLAY COUNT 148 OR EXPIRATION DATE 149 ACCURDING TO THE SELECTED DATA
END
END

FIG. 13
REPLAY OPERATION

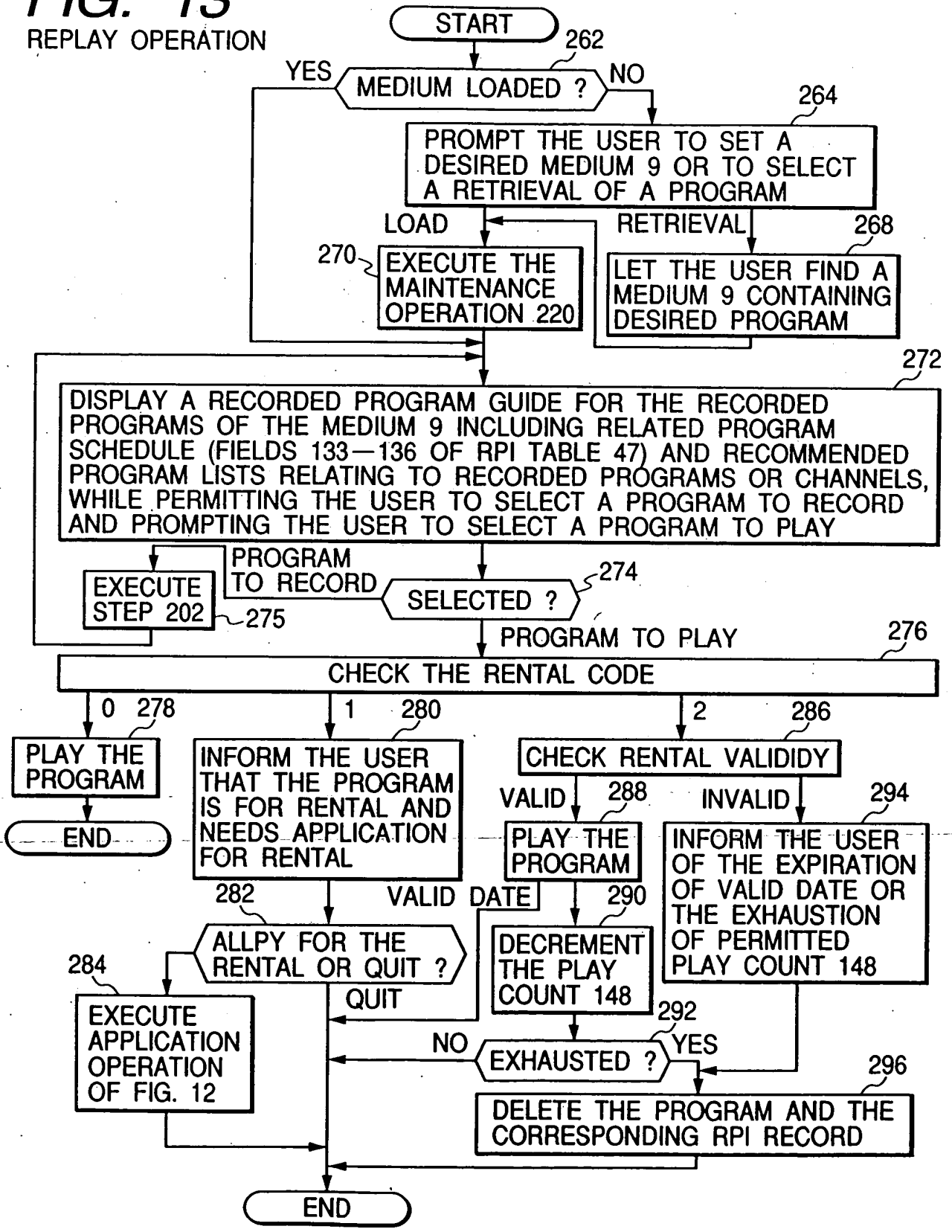


FIG. 14

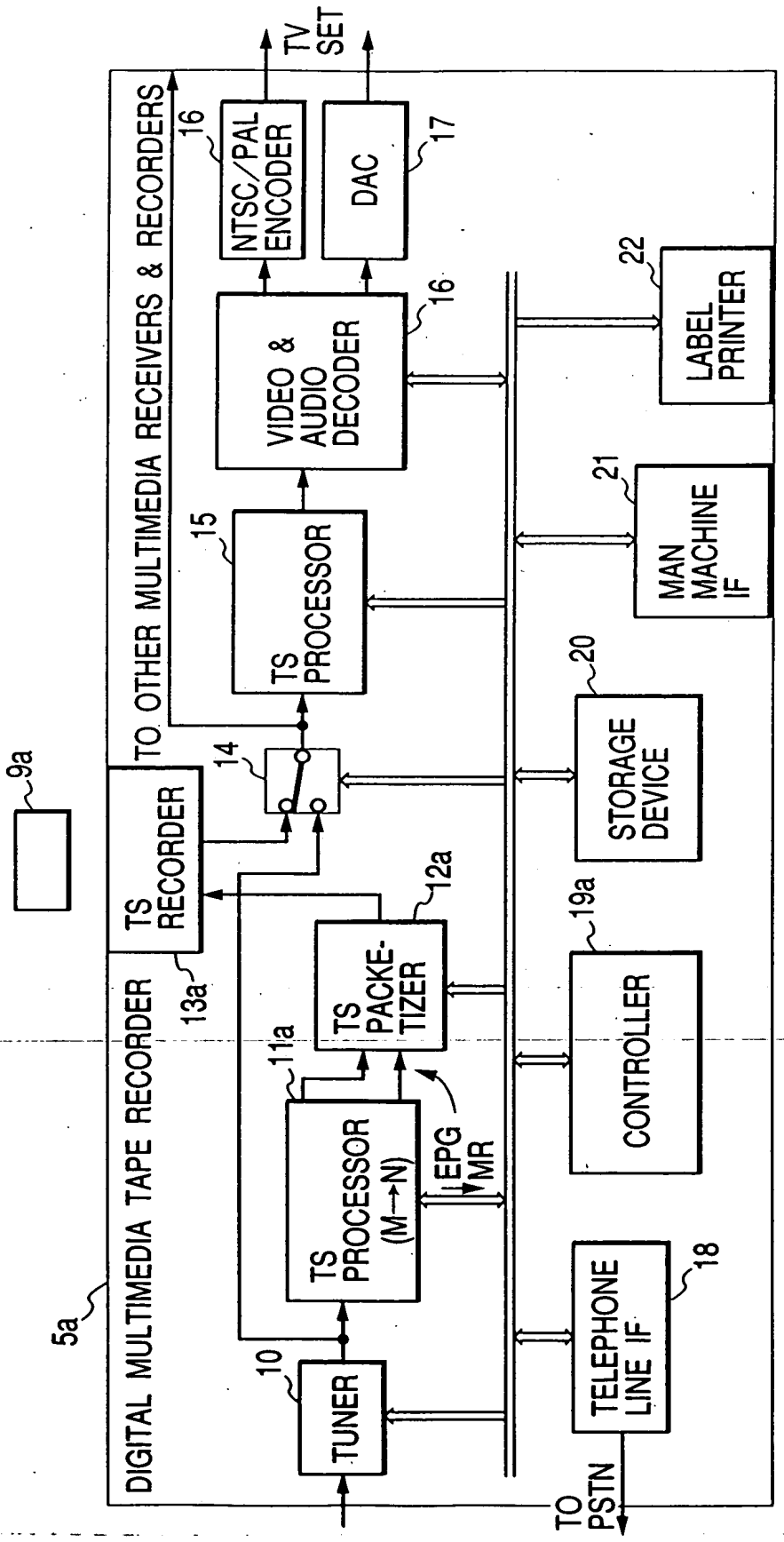

DIGITAL MULTIMEDIA TAPE RECORDER
5a
TO OTHER MULTIMEDIA RECEIVERS & RECORDERS
TV SET
9a
TS RECORDER
13a
14
TS PROCESSOR
15
NTSC/PAL ENCODER
16
DAC
17
VIDEO & AUDIO DECODER
16
LABEL PRINTER
22
MAN MACHINE IF
21
STORAGE DEVICE
20
TS PACKE-TIZER
12a
11a
TS PROCESSOR (M→N)
EPG MR
CONTROLLER
19a
TUNER
10
TELEPHONE LINE IF
18
TO PSTN

FIG. 15

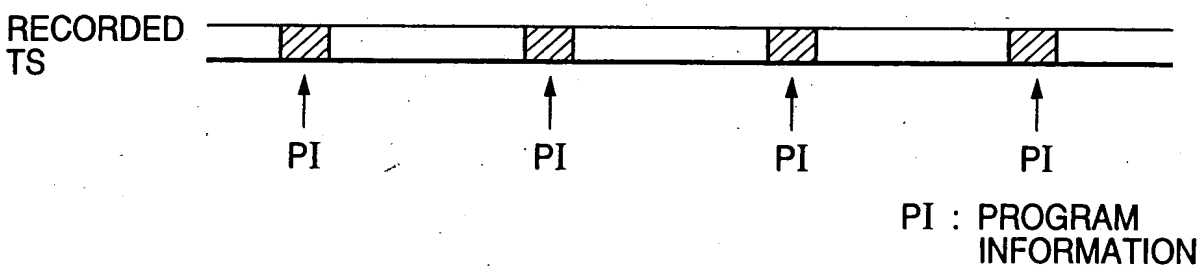

RECORDED
TS
PI
PI
PI
PI
PI : PROGRAM
INFORMATION

FIG. 17

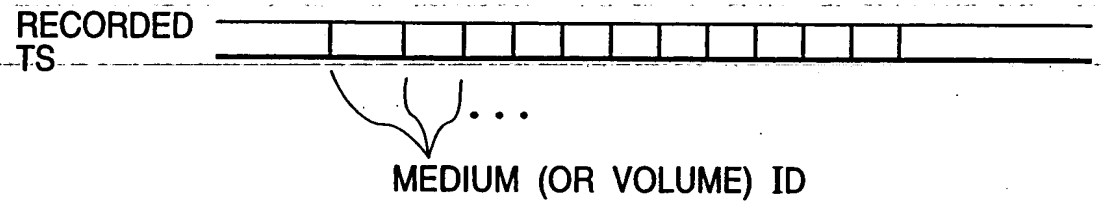

RECORDED
TS
...
MEDIUM (OR VOLUME) ID

FIG. 16

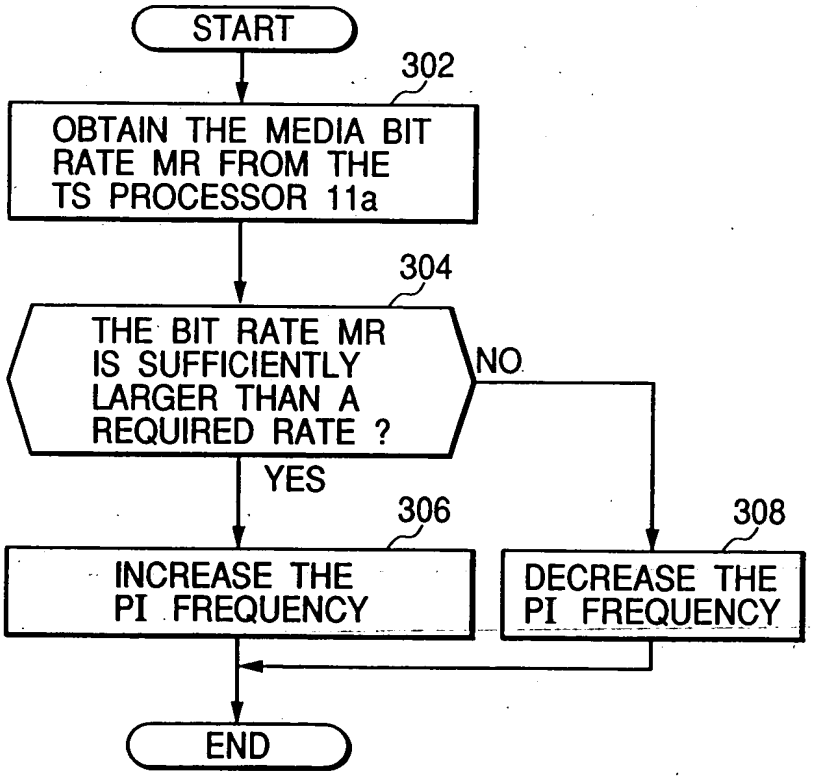

START
302
OBTAIN THE MEDIA BIT RATE MR FROM THE TS PROCESSOR 11a
304
THE BIT RATE MR IS SUFFICIENTLY LARGER THAN A REQUIRED RATE ?
NO
YES
306
INCREASE THE PI FREQUENCY
308
DECREASE THE PI FREQUENCY
END

FIG. 18

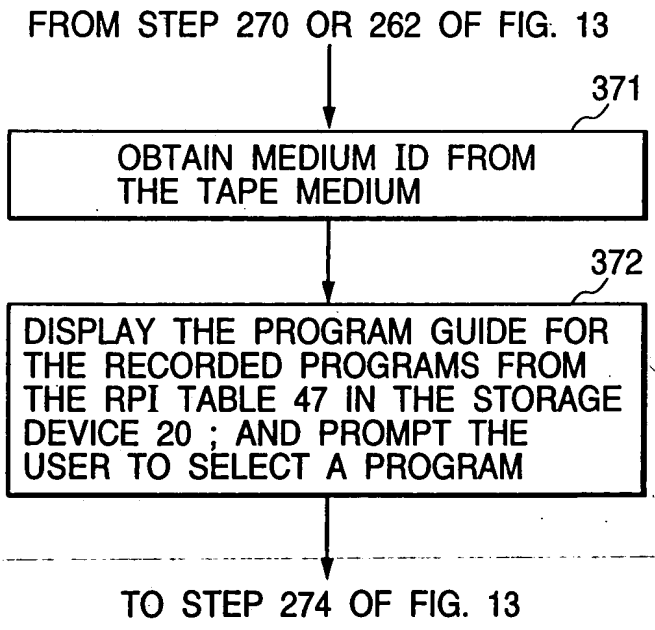

FROM STEP 270 OR 262 OF FIG. 13
371
OBTAIN MEDIUM ID FROM THE TAPE MEDIUM
372
DISPLAY THE PROGRAM GUIDE FOR THE RECORDED PROGRAMS FROM THE RPI TABLE 47 IN THE STORAGE DEVICE 20 ; AND PROMPT THE USER TO SELECT A PROGRAM
TO STEP 274 OF FIG. 13

FIG. 19

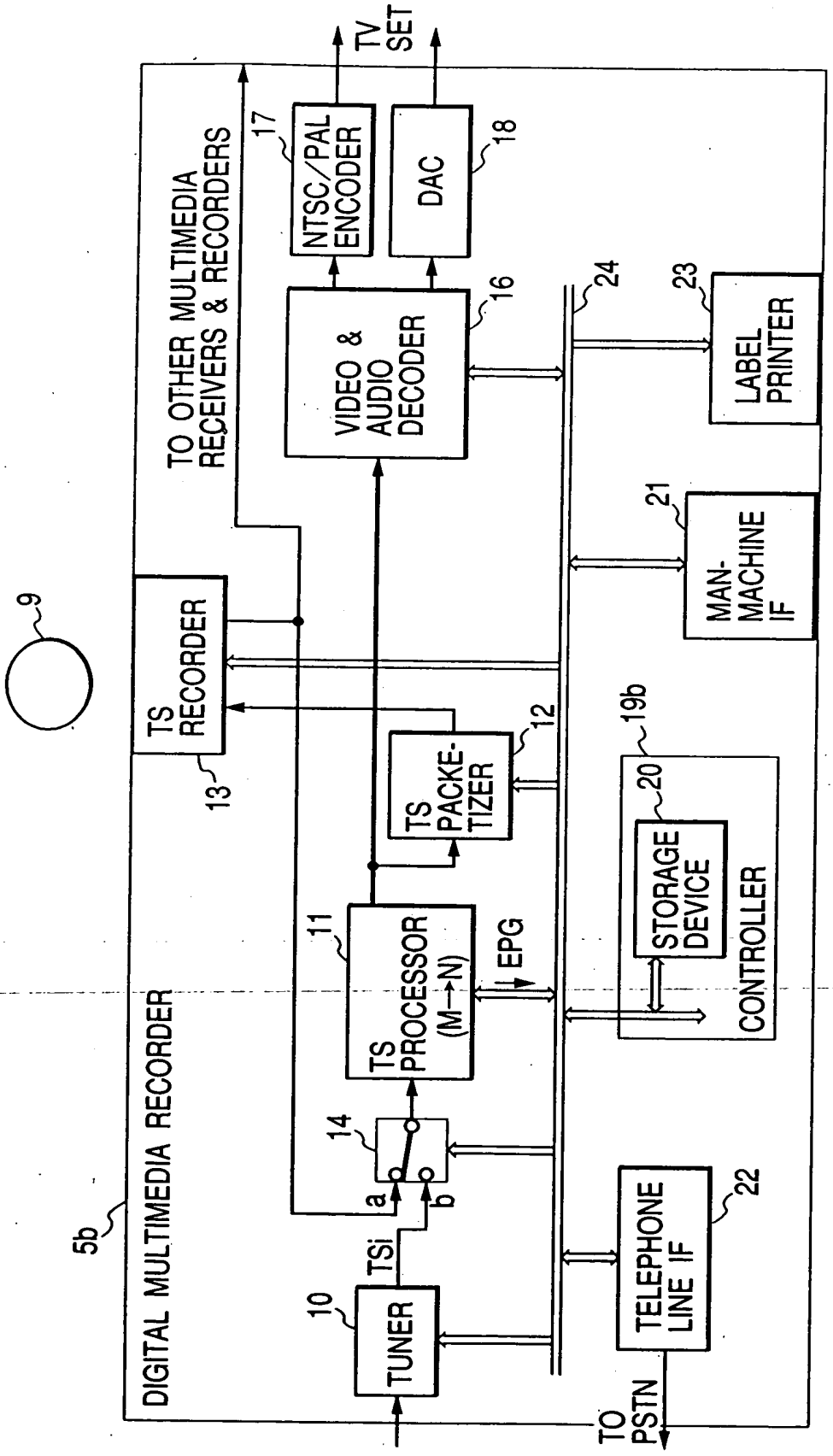
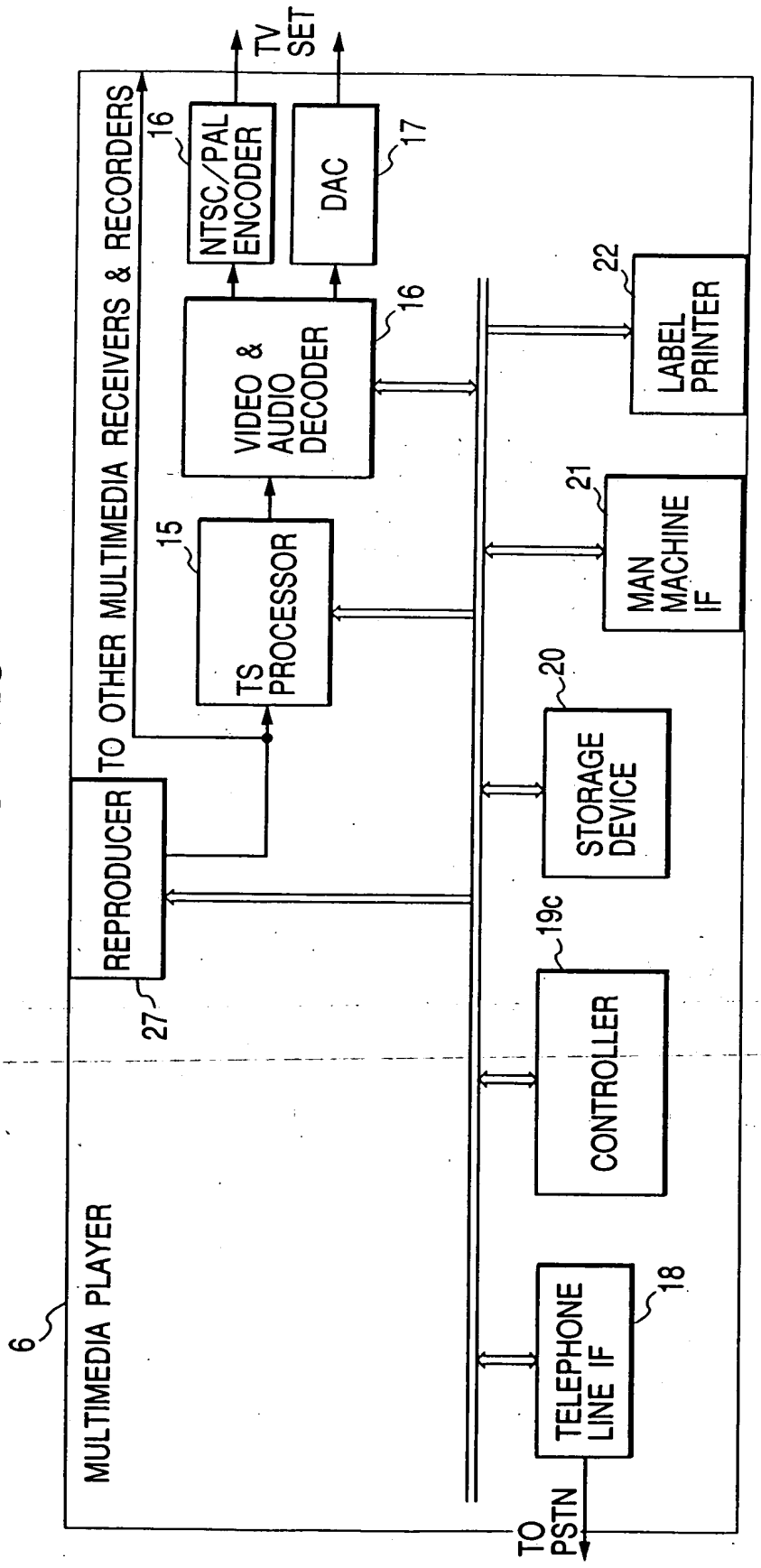

9
5b
DIGITAL MULTIMEDIA RECORDER
TO OTHER MULTIMEDIA RECEIVERS & RECORDERS
TV SET
NTSC/PAL ENCODER
17
DAC
18
VIDEO & AUDIO DECODER
16
24
23
LABEL PRINTER
21
MAN-MACHINE IF
TS RECORDER
13
TS PACKE-TIZER
12
19b
20
STORAGE DEVICE
CONTROLLER
11
TS PROCESSOR (M→N)
EPG
14
a
b
TSi
10
TUNER
TELEPHONE LINE IF
22
TO PSTN

FIG. 20


MULTIMEDIA PLAYER
6
TO OTHER MULTIMEDIA RECEIVERS & RECORDERS
REPRODUCER
27
TS PROCESSOR
15
VIDEO & AUDIO DECODER
16
NTSC/PAL ENCODER
16
DAC
17
TV SET
LABEL PRINTER
22
MAN MACHINE IF
21
STORAGE DEVICE
20
CONTROLLER
19c
TELEPHONE LINE IF
18
TO PSTN